

CADTH RAPID RESPONSE REPORT:
SUMMARY WITH CRITICAL APPRAISAL

Treatment of Neonatal Abstinence Syndrome due to Crystal Methamphetamine: A Review of Clinical Effectiveness and Guidelines

Service Line:	Rapid Response Service
Version:	1.0
Publication Date:	June 07, 2019
Report Length:	9 Pages

Authors: Charlotte Wells, Hannah Loshak

Cite As: Treatment of neonatal abstinence syndrome due to crystal methamphetamine: a review of clinical effectiveness and guidelines. Ottawa: CADTH; 2019 Jun. (CADTH rapid response report: summary with critical appraisal).

ISSN: 1922-8147 (online)

Disclaimer: The information in this document is intended to help Canadian health care decision-makers, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. While patients and others may access this document, the document is made available for informational purposes only and no representations or warranties are made with respect to its fitness for any particular purpose. The information in this document should not be used as a substitute for professional medical advice or as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process. The Canadian Agency for Drugs and Technologies in Health (CADTH) does not endorse any information, drugs, therapies, treatments, products, processes, or services.

While care has been taken to ensure that the information prepared by CADTH in this document is accurate, complete, and up-to-date as at the applicable date the material was first published by CADTH, CADTH does not make any guarantees to that effect. CADTH does not guarantee and is not responsible for the quality, currency, propriety, accuracy, or reasonableness of any statements, information, or conclusions contained in any third-party materials used in preparing this document. The views and opinions of third parties published in this document do not necessarily state or reflect those of CADTH.

CADTH is not responsible for any errors, omissions, injury, loss, or damage arising from or relating to the use (or misuse) of any information, statements, or conclusions contained in or implied by the contents of this document or any of the source materials.

This document may contain links to third-party websites. CADTH does not have control over the content of such sites. Use of third-party sites is governed by the third-party website owners' own terms and conditions set out for such sites. CADTH does not make any guarantee with respect to any information contained on such third-party sites and CADTH is not responsible for any injury, loss, or damage suffered as a result of using such third-party sites. CADTH has no responsibility for the collection, use, and disclosure of personal information by third-party sites.

Subject to the aforementioned limitations, the views expressed herein are those of CADTH and do not necessarily represent the views of Canada's federal, provincial, or territorial governments or any third party supplier of information.

This document is prepared and intended for use in the context of the Canadian health care system. The use of this document outside of Canada is done so at the user's own risk.

This disclaimer and any questions or matters of any nature arising from or relating to the content or use (or misuse) of this document will be governed by and interpreted in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein, and all proceedings shall be subject to the exclusive jurisdiction of the courts of the Province of Ontario, Canada.

The copyright and other intellectual property rights in this document are owned by CADTH and its licensors. These rights are protected by the Canadian *Copyright Act* and other national and international laws and agreements. Users are permitted to make copies of this document for non-commercial purposes only, provided it is not modified when reproduced and appropriate credit is given to CADTH and its licensors.

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Abbreviations

NAS	neonatal abstinence syndrome
RCT	randomized controlled trial

Context and Policy Issues

Neonatal abstinence syndrome (NAS) is defined as drug withdrawal symptoms experienced by a neonate upon birth due to maternal drug use during pregnancy.¹ Symptoms can include irritability, poor sucking, hypertonia, low birth weight and seizures.¹ NAS occurs most commonly with maternal opioid use, but can occur with other substances such as cocaine, cannabis, and amphetamines (including crystal methamphetamine).¹ Maternal drug abuse, both licit and illicit, has been growing in Canada.² Mothers who use methamphetamines in pregnancy tend to be younger, have lower levels of education, lower socioeconomic status, are more likely to drink and smoke during pregnancy, and have less prenatal care prior to child birth.² Pregnant persons who abuse drugs and their children are often a vulnerable group and require extra care and treatment.² Care for NAS due to opioids usually includes non-pharmacological treatment and pharmacological treatments, but standardization of care is difficult as symptoms of withdrawal may differ between neonates.³

The purpose of this report is to examine recent literature regarding diagnosis and treatment of NAS due to crystal methamphetamine.

Research Questions

1. What is the clinical effectiveness of interventions for the treatment of neonatal abstinence syndrome due to crystal methamphetamine?
2. What is the comparative clinical effectiveness of tools for the diagnosis and monitoring of neonatal abstinence syndrome due to crystal methamphetamine?
3. What are the evidence-based guidelines regarding the treatment of neonatal abstinence syndrome due to crystal methamphetamine?

Key Findings

No relevant literature was identified regarding clinical effectiveness of interventions for the diagnosis and treatment of neonatal abstinence syndrome due to crystal methamphetamine. Additionally, no evidence based guidelines were identified regarding treatment or diagnosis of neonatal abstinence syndrome due to crystal methamphetamine.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including Medline and PsycINFO via OVID, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were methamphetamine and neonates or neonatal abstinence. No filters were applied to limit the

retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and May 14, 2019.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Neonates with neonatal abstinence syndrome due to crystal methamphetamine
Intervention	Q1,3: Any treatments, either pharmacological or non-pharmacological Q2: Tools for monitoring or diagnosis of methamphetamine-related neonatal abstinence syndrome
Comparator	Q1: Any other treatment for neonatal abstinence syndrome (e.g., no pharmacotherapy for neonate post-birth) Q2: Other tools for monitoring methamphetamine-related neonatal abstinence syndrome Q3: Not applicable
Outcomes	Q1,2: Clinical effectiveness, safety Q3: Guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2014. Guidelines with unclear methodology were also excluded.

Summary of Evidence

Quantity of Research Available

A total of 374 citations were identified in the literature search. Following screening of titles and abstracts, 362 citations were excluded and 12 potentially relevant reports from the electronic search were retrieved for full-text review. No potentially relevant publications were retrieved from the grey literature search for full-text review. Of these potentially relevant articles, all 12 publications were excluded for various reasons, and no publications met the inclusion criteria and were included in this report. Appendix 1 presents the PRISMA⁴ flowchart of the study selection. Additional references of potential interest are provided in Appendix 2

Summary of Findings

No relevant literature or evidence-based guidelines were identified regarding the clinical effectiveness of interventions or recommendations for diagnosis or treatment of neonatal abstinence syndrome due to crystal methamphetamine; therefore, no summary can be provided.

Limitations

No relevant literature was identified regarding clinical effectiveness of interventions for diagnosis or treatment of neonatal abstinence syndrome due to crystal methamphetamine. Additionally, no evidence based guidelines were identified regarding treatment or diagnosis of neonatal abstinence syndrome due to crystal methamphetamine. One limitation of the present report is the limited search dates (extended only to 2014). It is possible that relevant literature exists that was published more than five years ago and was excluded by the current date-limited search.

Conclusions and Implications for Decision or Policy Making

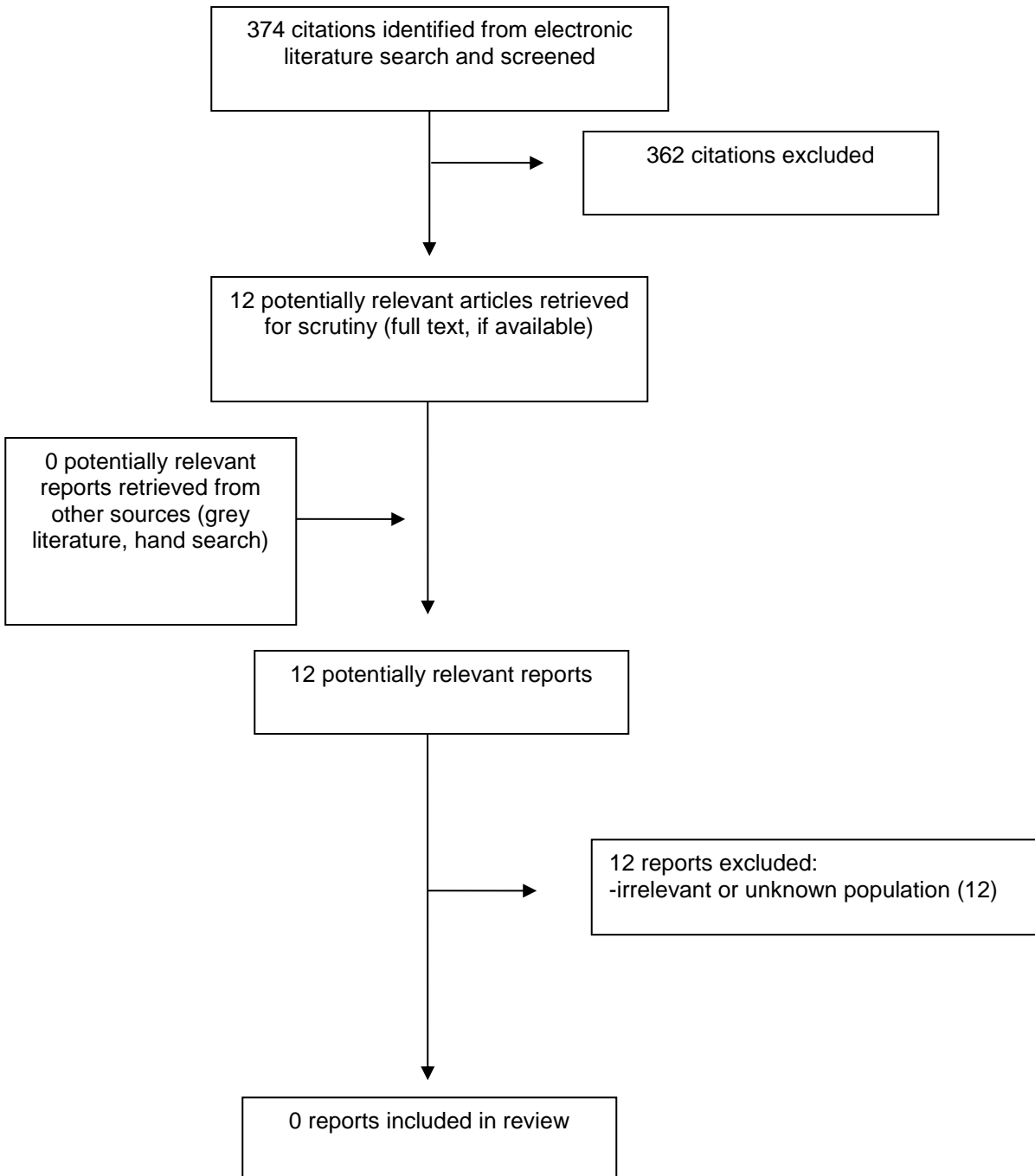
No relevant literature or evidence-based guidelines were identified regarding the clinical effectiveness of interventions or recommendations for diagnosis or treatment of neonatal abstinence syndrome due to crystal methamphetamine; therefore no conclusions regarding treatments or diagnostic tools for NAS can be provided.

There is a distinct lack of studies regarding diagnosis and treatment of NAS due to crystal methamphetamine. This gap in the literature precludes the creation of appropriate guidelines for health care providers who treat these patients. Future studies addressing this condition may help reduce uncertainty in diagnosis and treatment.

References

1. Streetz VN, Gildon BL, Thompson DF. Role of clonidine in neonatal abstinence syndrome: a systematic review. *Ann Pharmacother*. 2016;50(4):301-310.
2. Finnegan L. Licit and illicit drug use during pregnancy: maternal, neonatal and early childhood consequences. In: Ottawa (ON): Canadian Centre on Substance Abuse; 2013: <http://nbatc.ca/en/uploads/file/CCSA-Drug-Use-during-Pregnancy-Report-2013-en-1.pdf>. Accessed 2019 Jun 7.
3. MacMullen NJ, Dulski LA, Blobaum P. Evidence-based interventions for neonatal abstinence syndrome. *Pediatr Nurs*. 2014;40(4):165-172.
4. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol*. 2009;62(10):e1-e34.

Appendix 1: Selection of Included Studies



Appendix 2: Additional References of Interest

CADTH Reports

The diagnosis and treatment of neonatal abstinence syndrome: clinical effectiveness and guidelines. (CADTH Rapid response report: summary of abstracts). Ottawa (ON): CADTH; 2017: <https://www.cadth.ca/diagnosis-and-treatment-neonatal-abstinence-syndrome-clinical-effectiveness-and-guidelines-0>. Accessed 2019 Jun 7.

Developmental effects of in utero exposure to prescription drug abuse in infants and young children: harms. (CADTH Rapid response report: summary of abstracts). Ottawa (ON): CADTH; 2014: <https://www.cadth.ca/developmental-effects-utero-exposure-prescription-drug-abuse-infants-and-young-children-harms>. Accessed 2019 Jun 7.

Other Reports

Reviews

Oei JL. Adult consequences of prenatal drug exposure. *Intern Med J*. 2018;48(1):25-31.

Kocherlakota, P. Neonatal abstinence syndrome. *Pediatrics*. 2014;134(2).

Clinical Practice Guidelines – Methodology Uncertain

NHS Royal Cornwall Hospitals. Neonatal abstinence syndrome (NAS) – neonatal clinical guideline. 2018: <https://doclibrary-rcht.cornwall.nhs.uk/DocumentsLibrary/RoyalCornwallHospitalsTrust/Clinical/Neonatal/NeonatalAbstinenceSyndrome.pdf>. Accessed 2019 Jun 7.

See: Table 4 (Drug Treatment of NAS) – Non-opioid withdrawal and 2.4 Postnatal management

Winnipeg Regional Health Authority. Neonatal substance exposure: assessment and clinical management. 2018: <http://www.wrha.mb.ca/extranet/eipt/files/EIPT-035-043.pdf>. Accessed 2019 Jun 6.

See: Appendix A: Potential drugs of abuse

Provincial Council for Maternal and Child Health. Neonatal abstinence syndrome (NAS) clinical practice guidelines. 2016: <https://www.pcmch.on.ca/wp-content/uploads/2016/12/NAS-Clinical-Guideline-Update-Summary-of-Recommendations-2016Nov25.pdf>. Accessed 2019 Jun 6.

See: NAS Neonatal Guidelines: Newborn Treatment

Queensland Clinical Guidelines. Perinatal substance use: maternal. Brisbane (AU): Queensland Health; 2016: https://www.health.qld.gov.au/_data/assets/pdf_file/0023/140738/g-psumat.pdf. Accessed 2019 Jun 6.

Minnesota Hospital Association. Neonatal abstinence syndrome (NAS) toolkit. [no date]: <https://www.mnhospitals.org/Portals/0/Documents/patientsafety/Perinatal/Neonatal%20Abstinence%20Syndrome%20Toolkit.pdf>. Accessed 2019 Jun 6.

Tierney S. Identifying neonatal abstinence syndrome (NAS) and treatment guidelines. Iowa City (IA): University of Iowa Children's Hospital; 2014: https://uichildrens.org/sites/default/files/neonatal_abstinence_syndrome_treatment_guidelines_feb2013_revision-1.pdf. Accessed 2019 Jun 6.

Parenting children who have been exposed to methamphetamine: a brief guide for adoptive, guardianship, and foster parents. Portland (OR): Oregon Post Adoption Resource Center; [no date]:

<https://www.ohsu.edu/xd/research/centers-institutes/methamphetamine-abuse-research-center/education-outreach/loader.cfm?csModule=security/getfile&PageID=2536227>.

Accessed 2019 Jun 6.